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ABSTRACT

This investigation was conducted to determine changes in the levels of teaching efficacy as a function of the clinical experience in six public elementary schools, among pre-student-teaching novices in four subject areas: science, social studies, language arts, and mathematics. The sample included 58 novices who participated in the semester block of methods classes at the University of Alabama. Data for the study were gathered, before and after full-time clinical experience in the public elementary schools, using two strategies. First, all novices completed 23-item, Likert-type questionnaires. Second, through the use of questionnaire-guided narrative interviews, some of the factors that influenced novices' levels of efficacy were sought. Quantitative comparisons were made between novices' sense of efficacy before and after clinical experience by utilizing both multivariate and univariate analysis of variance. Findings revealed statistically significant personal teaching efficacy gain scores. Analysis also revealed significant differences between science and social studies scores, with the latter being the highest. No significant differences were found between the general teaching efficacy gains scores. Results of the study have implications for teacher education programs concerning levels among novices and the determination of specific contexts in which that efficacy can be interpreted. Appendixes contain five tables, a copy of the questionnaire, and a scoring guide. (Contains 36 references.) (Author/JB)

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Running Head: A COMPARISON OF SENSE OF EFFICACY

A Comparison of Sense of Efficacy Before and After Clinical Experience for Pre-Student-Teaching Novices in an Elementary Methods Program

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Paper presented at the annual meeting of the Mid-South Educational Research Association in Biloxi, Mississippi on November 9, 1995

Abstract

This investigation was conducted in an effort to determine changes in the levels of teaching efficacy, as a function of the clinical experience in six public elementary schools, among pre-student-teaching novices in four subject areas: science, social studies, language arts, and mathematics. The sample included 58 novices who participated in the semester block of methods classes at The University of Alabama.

Data for the study were gathered, before and after full-time clinical experience in the public elementary schools, using two strategies. First, all novices completed 23-item, Likert-type questionnaires. Second, through the use of questionnaire-guided narrative interviews, some of the factors that influence these levels of efficacy were sought. Quantitative comparisons were made between novices' sense of efficacy before and after clinical experience by utilizing both multivariate and univariate analysis of variance.

Findings revealed statistically significant personal teaching efficacy gain scores ($p<.05$). Tukey's HSD revealed significant differences between science and social studies, with the latter being the highest. No significant differences were found between the general teaching efficacy gain scores. Results of the study have implications for teacher education programs concerning levels among novices and the determination of specific contexts in which that efficacy can be interpreted.

A Comparison of Sense of Efficacy Before and After Clinical Experience for Pre-Student-Teaching Novices in an Elementary Methods Program

Effective teachers tend to have a high sense of efficacy about their own teaching. They believe that they can help almost all of their students learn, including those who are the most difficult to teach (Berman & McLaughlin, 1977). A high sense of efficacy has been identified as one of the teacher dispositions associated with effective practice, along with job satisfaction, professional engagement, and commitment to teaching (Chase, 1991).

A host of research on teacher efficacy was launched in the 1980s. Researchers almost invariably acknowledged Bandura (1977, 1982, 1986), for his construct of self-efficacy, as the source of their theoretical background. Gibson and Dembo (1984) applied Bandura's theory to teachers and suggested sense of efficacy as a variable accounting for variations in teaching ability. Research in 1987 by Tracz and Gibson identified this construct as an important variable in both teacher and school effectiveness. These researchers found that personal teaching efficacy (the belief that the individual can bring about achievement in students) correlated positively with reading achievement when combined with whole class instruction, as opposed to small group instruction. General teaching efficacy (the belief that students can succeed or learn) correlated significantly with both language and mathematics achievement in

students. This study showed that the teachers' sense of efficacy related significantly to both achievement and grouping of students.

In 1984, Ashton studied teachers' sense of efficacy to determine how influential teachers believed they were concerning student learning and found that student-student interaction, teacher efficacy, and student achievement were significantly related. High-efficacy teachers in this study group seemed to set high academic levels for their students, as they monitored their learning, developed a caring and supportive environment, and provided academic instruction. Those teachers with low efficacy levels tended to do the reverse. School factors such as teaming, cooperative decision-making, and multi-age grouping appeared to increase teachers' sense of efficacy.

Due to the dilemmatic nature of teaching, effective practice requires a sense of self-efficacy beyond mere knowledge and skills. O'Laughlin (1991) suggested that teaching is a resolution of dilemmas and teachers' conceptions of authority can be investigated by assessing their sense of efficacy. Also, assessing preservice teachers' perceptions of dilemmatic situations is necessary to ensure that their university programs address these areas and begin to develop confidence and efficacy in each. Teaching is more than helping groups of children succeed, requiring a great deal of individual assistance and guidance. Without a sense of efficacy

among teachers, low-achieving students will have little or no chance. Ysseldyke, Thurlow, and Christenson (1987) generalized that "teachers who believe their efforts would make no difference in the student's learning may be more likely to move on to another student for whom they can make a difference" (p. 35).

Most teacher training institutions engage in three basic practices: (a) identification of effective teaching behaviors, (b) instructions and guidance in communicating this to novices, and (c) overseeing the implementation of these effective teaching behaviors by the novices themselves in clinical experiences (Gorrell & Capron, 1990). University preparation programs for teachers need to evaluate efficacy levels of their teacher education students and begin to find ways to enhance their sense of efficacy for teaching. Only then can these programs begin to launch future teachers who are ready, willing, and able to meet the needs of their students. Therefore, the present study was designed to measure pre-student-teaching novices' sense of efficacy.

Self-efficacy has been shown to be domain specific; however, generalization does occur to some extent across related domains (Bandura, 1982, 1986; Schunk, 1984). Some researchers have singled out the subject areas and have found, for example, that greater teacher efficacy results in advanced reading achievement (Ashton & Webb, 1986). The present study was undertaken to discover whether any differences were evident

in pre-student-teaching novices' sense of efficacy across four different subject areas. Language art, mathematics, science, and social studies were chosen as the four subject areas to assess because they function as the core of the elementary curriculum.

Sense of efficacy among pre-student-teaching novices has not been extensively examined. A few researchers (e.g., O'Laughlin, 1991) have studied teacher education students' beliefs. However, the research literature is limited on the subject of those prior to the student-teaching level with regard to teaching efficacy. Teaching efficacy probably does not begin at the onset of student-teaching (Cole & Knowles, 1993; Knowles & Hoefler, 1989; Martin, 1989). Some researchers have suggested that cooperating teachers have a more significant role in influencing clinical experience students than do their teacher education instructors or supervisors (e.g., Tinning, 1983). Therefore, this study was designed to specifically focus on pre-student-teaching novices in a university program offering a coordination of subject area methods classes with clinical experience in the public elementary schools. The problem of the study was to determine any positive gains in pre-student-teaching novices' sense of efficacy from before to after their clinical experience, with regard to each of the four subject areas.

Due to the consideration of Gibson and Dembo's (1984) suggestion that efficacy is context specific and may not be

generalized across settings, the present research study was designed to determine what, if any, differences existed between novices assigned to low- and high-socioeconomic schools. Several researchers (e.g., Guskey, 1987) have studied ability levels of students with regard to teacher efficacy. But other student variables, such as race or socioeconomic levels, have not been investigated. Concern for educating diverse populations and for effective teaching in difficult teaching areas are two themes currently expressed in the literature. The importance of teaching with multicultural curricula and teaching diverse learners are topics under immediate consideration (Sleeter, 1992).

Teachers need to be knowledgeable and sensitive to other cultures by analyzing their often unquestioned beliefs about other cultures and realizing that their beliefs are frequently from the perspective of their own culture (McDiarmid & Price, 1993; Pasch, 1993). By utilizing questionnaire-guided narrative interviews, some of the factors that influence these novices' sense of efficacy were sought, as well as the specific contexts necessary to consider when defining that efficacy. Some of the factors and their influences upon pre-student-teaching novices' sense of efficacy included: (a) student characteristics, (b) school subjects, (c) school settings, (d) grade level, (e) people who have significantly influenced their sense of general teaching efficacy and personal teaching efficacy, and (f) support systems for their sense of efficacy.

Clinical experiences have long been a "must" in preservice teacher education. Does such an experience impact the sense of efficacy of preservice teachers? Does it impact the sense of efficacy of preservice teachers in a placement prior to student teaching? The purpose of this study was to investigate the relationship between pre-student-teaching novices' sense of efficacy before and after clinical experience. Both general and personal teaching efficacy levels were sought for the following school subjects: science, social studies, language arts, and mathematics.

Method

Participants

Fifty-eight pre-student-teaching novices (1 male, 57 females), who were enrolled in a block of methods classes at The University of Alabama, were used in this study. All participated in completing the questionnaires, and 79% signed to participate in interviews. Most of those who declined to participate in the interviews volunteered that due to their class load, they were unable to schedule any additional activities during the semester. Most of these novices were Caucasian females (93%); three were African American females and one was a Caucasian male. The mean age for the group was determined as 22.37 with a range of 20 to 37.

The methods classes consisted of a set of courses that preservice teachers participated in during the semester preceding the student-teaching semester. These courses included

science, social studies, reading/language arts, mathematics, and classroom management. The major focus of the methods classes was the integration of subject areas into thematic units, constructed and taught by each novice, on a topic that was agreed upon between the cooperating teacher, novice, and University methods instructors. Novices were randomly assigned to one of six clinical experience school sites. It was assumed that pre-student-teaching novices received similar experiences prior to their clinical placement into the public schools and that their participation at different school sites would yield differences in their reported efficacy levels during the questionnaire-guided narrative interviews.

School Sites

Six schools, from two different school systems, comprised the clinical experience school sites for the methods program. Socioeconomic status of the elementary school populations was inferred from the percent of students qualifying for free or reduced lunches.

Three of the elementary schools offered kindergarten through fifth grades and were used as clinical experience sites, while three others in a different school system offered kindergarten through sixth grades. The school populations ranged from 323 to 644 students. The range of percent of students qualifying for free or reduced lunches was from 9% to 94% of the total school population. The two schools that ranked the highest in this category had 100% African American student

populations. Three of the other schools had less than 10% of their students reported to be in categories other than Caucasian.

Instrumentation

Two types of instruments were used to gather data concerning pre-student-teaching novices' sense of efficacy. The quantitative instrument consisted of the revised Science Teaching Efficacy Belief Instrument (STEBI B) constructed and validated by Enochs and Riggs (1990). The original version was a 25-item, Likert-type scale with response categories between "strongly agree" and "strongly disagree" (Riggs & Enochs, 1989). The preservice version was arranged by placing the verbs in the future tense. For example, one item on the inservice version read "Even if I try very hard, I do not teach science as well as I do most subjects." The preservice version was worded "Even if I try very hard, I will not teach science as well as I do most subjects." The instrument was designed to measure both Personal Science Teaching Efficacy Belief (personal teaching efficacy), and Science Teaching Outcome Expectancy (general teaching efficacy). The word "science" was replaced by "language arts" on the language arts form, as well as changes for the mathematics and social studies versions.

The qualitative instrument was a common interview protocol, consisting of eight questions asked by the researcher during interview sessions with six of the pre-student-teaching novices chosen randomly from the whole group. A panel of eight

experts, who reviewed the questions to guide the interviews, included University instructors, graduate teaching assistants, and cooperating teachers from the participating schools.

Design and Procedure

The statistical design used in the study was a multivariate analysis of variance. The Wilks' Lambda test criterion was used to test for statistical significance at a predetermined alpha level of .05. Following the decision strategy of Hummel and Sligo (1971), the univariate analyses were computed according to the significant multivariate *F* ratios. Significant univariate *F* ratios were followed by Tukey's procedures to determine group differences.

Using the same questions, the six novices were interviewed once before the clinical placement in the school settings and once after they returned to the University setting. Qualitative coding strategies, as suggested by Bogdan and Biklen (1992) and Spradley (1979), were employed, meaning that common themes were identified as they emerged and categories were generated throughout the interview sessions. Due to the dynamic nature of the interviews, the researcher chose to probe more deeply certain aspects and questions, depending upon the individual responses.

Results

Questionnaires

The STEBI-B contained two subscales: general teaching efficacy and personal teaching efficacy. Efficacy scores were computed by calculating the mean for the items in each subscale

(see Table 1). Data consisted of difference scores on the two subscales of the questionnaire for before and after clinical experience.

Null Hypothesis 1: No multivariate school subject effect, including science, social studies, language arts, and mathematics, on the differences in the general teaching efficacy and personal teaching efficacy scores among the pre-student-teaching novices, as measured by after clinical experience minus before clinical experience will be found.

Univariate school subject effects on general teaching efficacy and personal teaching efficacy were examined next.

Null Hypothesis 1-a: No univariate school subject effect, including science, social studies, language arts, and mathematics, on the differences in the general teaching efficacy scores among the pre-student-teaching novices, as measured by after clinical experience minus before clinical experience will be found.

Null Hypothesis 1-b: No univariate school subject effect, including science, social studies, language arts, and mathematics, on the differences in the personal teaching efficacy scores among the pre-student-teaching novices, as measured by after clinical experience minus before clinical experience will be found.

Interviews

Following qualitative data collection, consisting of interviews with six of the novices, the information was read

extensively and coded according to common themes and categories. After the data were reported in narrative form, the researcher allowed three doctoral students from the University to read the verbatim interviews and verify the findings and conclusions by verbalizing their own conclusions. The following provide the two research questions and the corresponding questionnaire items that determined their answers.

Research Question 1: What are the factors and their influences affecting the variance in pre-student-teaching novices' sense of efficacy?

Questionnaire Item 1: Are there some students who are more difficult to teach than others?

Questionnaire Item 2: If so, what are the characteristics of those students who are the most difficult to teach? What subjects are the most difficult to teach these students?

Questionnaire Item 3: What are the characteristics of those students who are the easiest to teach? What subjects are the most difficult to teach to even these students?

Questionnaire Item 4: If you were given the ability to choose an excellent school setting to enter for your first year of teaching, what characteristics would you look for in that school in order for you to be the most effective as a teacher and have high student achievement scores?

Questionnaire Item 5: If you knew that your superiors would visit and evaluate your teaching on a particular day, what grade level and subject area would you choose to teach?

Research Question 2: Who has had the most influence upon pre-student-teaching novices' sense of general teaching efficacy and sense of personal teaching efficacy?

Questionnaire Item 6: Can teachers be effective in the classroom regardless of such student variables as race and socioeconomic background? Who has been the greatest influence upon your beliefs about how effective teachers can be in classrooms? (general teaching efficacy)

Questionnaire Item 7: Do you feel that you personally can be effective in the classroom regardless of student variables such as race and socioeconomic background? Who has been the greatest influence on your beliefs about how effective you can be in the classroom setting? (personal teaching efficacy)

Questionnaire Item 8: Do you feel better about the potential to be an effective teacher when you are participating in University classes or when you are in your clinical placement in the public schools?

Discussion

The first hypothesis posited that an overall multivariate school subject effect including science, social studies, language arts, and mathematics would not be found on the differences in the general teaching efficacy and personal teaching efficacy scores among pre-student-teaching novices. This was measured by subtracting before clinical experience questionnaire scores from after clinical experience questionnaire scores. This hypothesis was rejected, meaning

that a significant school subject effect did exist for pre-student-teaching novices, $F(6, 454) = 2.33$, $p = 0.03$ (see Table 2). Univariate analyses were conducted to determine if there were significant general teaching efficacy effects or personal teaching efficacy effects. Follow-up tests were also conducted to determine what, if any, subject area differences existed for each subscale.

General teaching efficacy was defined as the teacher's belief that students can succeed or learn (Tracz & Gibson, 1987), as measured by the scale score on the questionnaire. The differences in before and after clinical experience score mean for General Teaching Efficacy was calculated at 1.98. This was not found to be statistically significant, $F(3, 228) = 1.31$, $p = 0.27$ (see Table 3). The univariate analysis revealed that there was not a significant school subject effect for general teaching efficacy. In other words, pre-student-teaching novices failed to report significantly different levels of general teaching efficacy after clinical experience in the public elementary schools, as compared to their reported levels before full-time clinical experience. Although the scores were not significantly different from each other, science general teaching efficacy scores were the highest, followed by language arts and social studies. Mathematics scores were the lowest of all on the general teaching efficacy scale.

Personal teaching efficacy was defined as the belief in one's ability to bring about achievement in students (Tracz & Gibson, 1987), as measured by the scale score on the

questionnaire. The differences in before and after clinical experience score mean for Personal Teaching Efficacy was calculated at 3.20. This was found to be statistically significant, $F(3,228) = 2.81$, $p = 0.04$ (see Table 4). The univariate analysis revealed that there was a significant school subject effect for personal teaching efficacy. In other words, pre-student-teaching novices reported significantly different levels of personal teaching efficacy after clinical experience in the public elementary schools, as compared to their reported levels before full-time clinical experience.

A post hoc investigation was conducted using Tukey's HSD procedure. This investigation revealed that there was a significant difference (Tukey's HSD = 3.66, $p<.05$) between science and social studies personal teaching efficacy scores. Pre-student-teaching novices reported significantly higher levels of personal teaching efficacy for social studies as compared to science. Mathematics and language arts were not found to be significantly different from each other or the other two subject areas. The means for each subject area are displayed in Table 5.

The first research question dealt with the factors that influence pre-student-teaching novices' sense of efficacy, and was answered through questionnaire-guided narrative interviews with the researcher. These factors included student

characteristics, school subjects, school settings, and grade levels.

When questioned about student characteristics as they related to their sense of efficacy, all six of the novices reported that there were some students who were harder to teach than others. However, they seemed more sure of this belief after they returned from their clinical experience in the public elementary schools. In interviews, novices tended to refer to such student characteristics as minority race and low-socioeconomic background as causal agents for lack of achievement. Those students who were considered as most difficult to teach were boys, lower socioeconomic groups, minority race, less attentive, not willing to learn or to try, from homes with only one parent, and less-abled in the specific areas of sight, hearing, and speech. The students who were considered as easiest to teach were girls, upper socioeconomic groups, majority race, quiet, attentive, well-behaved, hardworking, concerned about and interested in school, confident, and, from homes with two parents who were involved in their education.

When novices were queried about subject areas as it related to their sense of efficacy, mathematics was considered as the subject that was hardest to teach to students who were the most difficult to teach. Several reasons seemed to explain this choice. First of all, novices reflected upon their own experiences with mathematics as being difficult and less

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interesting, when compared to the other subject areas. Secondly, novices tended to portray a belief that mathematics achievement was more attributable to inborn tendencies, as opposed to increased levels of effort or the application of effective teaching techniques. Thirdly, novices consistently reported that from their experience in schools, they found that teachers seldom provided manipulatives for students to successfully understand mathematics concepts.

Language arts and reading, on the other hand, were the subject areas identified as the most difficult to teach to students who were the easiest to teach. Novices also reflected upon their own elementary school experiences and reported that they would not want to read something if they were not interested in it. This switch from mathematics to language arts seemed to be explained too by an underlying belief that the easiest children to teach were already successful in mathematics. When asked which subject area they would teach if they were to be observed, novices reported a preference for science and social studies. This preference was also due to their beliefs that they would be able to make these lessons more manipulative and hands-on.

Novices constructed an excellent school setting to enter for their first year of teaching as one that would positively affect their sense of efficacy. Thick, rich descriptions were provided of a predominantly Caucasian, middle or upper socioeconomic level population. Most novices added that

students would come from homes having both parents who were actively involved in their children's education. Cooperation among the faculty members and a supportive principal were also seen as necessary components of this school setting for the enhancement of their sense of efficacy.

Because of the experience with some older elementary students' lack of respect for their teachers and their focus on peers, novices considered upper elementary children to be the ones who were most difficult to teach. Surprisingly, when asked what grade level they would choose to teach a demonstration lesson in, most novices considered an upper elementary grade level as preferable because of the students' maturity and independence levels and their beliefs that they would be able to do more hands-on activities with them.

The second research question sought to determine: (a) the people who had been most influential upon pre-student-teaching novices' sense of general teaching efficacy and personal teaching efficacy, and, (b) the support systems for the novices' sense of efficacy. In interviews, novices tended to hold the belief that teachers can be successful regardless of such student variables as race and socioeconomic background, as an indication of their general teaching efficacy, and that they personally can be successful regardless of these student variables, as an indication of their personal teaching efficacy.

Novices did not offer many elaborative comments about their general teaching efficacy beliefs, but did reinforce

their personal teaching efficacy beliefs with positive statements about their individual abilities and confidence levels. The most significant influences upon pre-student-teaching novices' sense of general teaching efficacy came from two main groups of people: (a) family members who had been or were teachers themselves, and, (b) present or previous University instructors. The latter group of people was changed to cooperating teachers after their clinical experience in the public elementary schools. Personal teaching efficacy seemed to also be influenced by the same two groups of people. However, none of the novices mentioned cooperating teachers before or after clinical experience as influencing their personal teaching efficacy.

The support system for the novices' sense of efficacy was unanimously determined as the clinical experience in the public elementary schools, as opposed to participation in University classes. Their reasons were multiple and varied, but centered upon the idea that the clinical experience was more authentic, and that they gained a great sense of satisfaction from trying their ideas and strategies with children.

Conclusions

The primary findings of this study indicated that pre-student-teaching novices' sense of personal teaching efficacy was positively affected by the clinical experience in the public elementary schools. Also, their levels of personal social studies teaching efficacy were significantly higher than

their levels of personal science teaching efficacy. More specifically, the following conclusions are supported by the data.

The results of the study indicated that pre-student-teaching novices regarded their efficacy in light of the school setting, rather than the University setting, as found by other researchers such as Martin (1989). This seemed to explain why novices' sense of personal teaching efficacy was significantly higher after clinical experience in the public elementary schools.

Clinical experience in the public elementary schools seemed to enhance efficacy for a couple of reasons. The experiences provided a necessary authentic school experience and the opportunity to work with children. Pre-student-teaching novices seemed to develop their personal teaching efficacy from working with the students themselves.

Pre-student-teaching novices tended to attribute socioeconomic background and minority race as causal agents for lack of achievement. When a few students were described as being difficult to teach, novices attributed these negative student variables as the cause for lack of achievement. Other researchers, such as Tracz and Gibson (1986), have concluded from their studies that the teacher's belief, about his or her limited abilities to overcome the students' inadequate home environments, negatively affects mathematics and reading achievement.

During interviews with six of the novices, it was concluded that they have the same misunderstandings of African American children that Hilliard (1992) reported. He stated that the two most prevalent misunderstandings about African American children concern their language abilities and intellectual potential. Novices seemed to point to the African American "nonstandard English" and their difficulty in teaching these students as though the language abilities determined the students' intellectual capabilities.

Pre-student-teaching novices differed in their reported subject area efficacy levels for both general teaching efficacy and personal teaching efficacy. Interestingly, science was found to be the highest on the general teaching efficacy scale, yet the lowest on the personal teaching efficacy scale. The low personal science teaching efficacy score could be partially explained by the obvious imbalance of males to females (1:57). As reported by other researchers (i.e., Riggs, 1991), males in both inservice and preservice roles have tended to report significantly higher science teaching efficacy scores than have females. Therefore, the personal science teaching efficacy score might have been higher if more males had participated in the study. On the other hand, in interviews, novices reported that they would rather teach science if observed, because of their perceived ability to demonstrate an effective science hands-on lesson.

Language arts and mathematics ranked second and third on the general teaching efficacy scale and switched positions on

the personal teaching efficacy scale. During interviews, novices reported language arts as the subject area hardest to teach to the students who were the easiest to teach. Mathematics was reported as the subject area hardest to teach to the students who were the most difficult to teach. One explanation for language arts and mathematics being reflected in the interviews, but not the questionnaires, as being difficult subjects to teach, is the limitation that was placed upon the interview questions themselves. In the interviews, novices were not asked about entire classes of students when they reported language arts and mathematics as difficult subjects to teach. Rather, they were reporting their difficulties with students who represented the extremes. Therefore, it is concluded that subject area efficacy is context specific (Bandura, 1977) and depends upon whether the novice is referring to particular categories of students or entire classes.

From information gained in the interviews, it can be concluded that a threat to novices' sense of efficacy is the disparity between the University setting and the classroom setting. This concern was articulated in a number of ways, and other researchers, such as O'Laughlin (1991), have also concluded this from their studies.

It can be concluded, from interviews with the pre-student-teaching novices, that they have lower efficacy levels for special education students. When asked to

characterize the students who were most difficult to teach, several of the novices mentioned those students who had problems with seeing, hearing, speaking, and attending to classroom stimuli. This is a conclusion that has been drawn by other researchers, such as Sachs (1988), who have called for regular educators to be trained in teaching mainstreamed special education students so that their efficacy levels, for these students, match or approach the efficacy levels they have for their regular education students.

Implications

The findings of the present study are important in several respects. Not only does this study have implications for pre-student-teaching novices, but for professionals in the field and teacher preparation programs as well.

Teachers are generally not reflective about their teaching (Ashton, 1984). If they reflect, then the connection between actions and beliefs is more likely to be made. Preservice and inservice teachers need to ask themselves if their behaviors are consistent with their beliefs. University preparation programs for teachers will need to help their novices determine their efficacy beliefs and to distinguish between the two types of teaching efficacy, general and personal. This will probably require university instructors, supervisors, and cooperating teachers to analyze their own philosophies and efficacy beliefs before helping novices to do so.

University programs need to help novices identify and define dilemmatic situations (O'Laughlin, 1991) as potential

threats to their sense of efficacy. The guided successful resolution of these dilemmas helps novices gain confidence and, hence, reinforces and builds efficacy. The most appropriate method of guiding novices' successful resolution of these dilemmas would seem to involve the cognitive modeling strategy suggested by Bandura (1977). As noted earlier, Schunk (1984) suggested that this reasoning aloud of processing information raises self-efficacy because the learner (novice) identifies with the successes of the model (university instructor or cooperating teacher). Therefore, an implication for teacher education programs and clinical experience school sites would be for those who guide the novices to use cognitive modeling strategies. In doing so, novices will gain an insight into how professionals successfully approach and resolve dilemmatic situations.

Tinning (1983) reported that cooperating teachers often have more influence upon the novices' beliefs than do their university instructors or supervisors. In interviews with a few of the novices, this study also found some evidence for this tendency. Even more vivid was the tendency to view some instructors as having a deficit of knowledge concerning contemporary public elementary schooling. An implication for university teacher education instructors and supervisors is that they portray a better sense of knowing what goes on in the "real world of schools." Novices need to see their university instructors and supervisors as aware of the complexity of the

school environment. Their instructors and supervisors need to bridge the gap between research and practice by modeling the realization that many classroom and school variables will determine how one teaches or applies research information.

Pre-student-teaching novices reported a belief in students' abilities to learn science over language arts, social studies, and mathematics, respectively, as indicated by their general teaching efficacy scores. They also reported a belief in their abilities to bring about achievement in students in the subject area of social studies, over mathematics, language arts, and science, respectively, as indicated by their personal teaching efficacy scores. The implication for future methods courses reflecting such beliefs in students would be for their university instructors to analyze the differences between the general teaching efficacy and personal teaching efficacy beliefs of their students at the beginning of the semester. Questionnaires, such as the ones used in this study, might be administered.

With the assessment of these beliefs, university instructors would be better able to focus their instruction and guidance. For example, as a group, these novices reflected a need for believing in their own abilities to bring about science achievement in students, but were confident in students' abilities to succeed in this subject area. Therefore, the focus for a group such as this could be upon the development of the novices' own science teaching abilities.

Whereas, this development would not have been needed as much in the subject area of social studies. The mathematics methods course, on the other hand, could have reflected more emphasis on elementary students' abilities to learn and to succeed in this subject area, despite such negative student variables as minority race and socioeconomic level.

A variety of limitations were inherent in this investigation and should be considered when making generalizations about this study. These limitations are as follows.

This study is subject to the limitations concerning the validity of any self-report measure. Novices reported their levels of efficacy through the written measure of the 23-item, Likert-type questionnaire and their self-referenced reportings from the questionnaire-guided narrative interviews. Additionally, there are the problems of recall and objective evaluation of their own efficacy levels.

Interviews were limited to one pre-student-teaching novice per clinical experience school site. Future research might incorporate the interview of more of the novices from each school site. Also, important information might have been lost due to the fact that roughly 20% of the novices declined to be considered as candidates for the questionnaire-guided narrative interviews.

Clinical experiences and background experiences with each subject area prior to this study varied for each

pre-student-teaching novice and should be considered when utilizing the results of this experiment.

Recommendations

As a result of the findings of this study, several recommendations are offered for future research. The subjects in this study were restricted to pre-student-teaching novices in a methods block program. Further study is recommended to increase the levels of preservice teachers in the study to include the spectrum from early novices through student-teachers. A longitudinal study to examine the changes in their sense of efficacy over time and experience is suggested. Following these novices through their internship and into their first year of teaching would provide the ability to make further generalizations about the total undergraduate teacher education program. Also, comparisons between preservice and inservice teachers' sense of efficacy would be easier to construct. Novices received different clinical experiences due to their placement into different public elementary schools. It should be determined whether or not these school site effects level out after the novices finish the student-teaching semester, due to the fact that they would be assigned to a school setting different from the one in which they completed clinical experience during the pre-student-teaching semester.

A few questions need to be answered in order to provide authentic school experience for novices and, at the same time,

assure that attrition rates remain low. Are the threats to efficacy accumulated if novices are placed into difficult school settings for pre-student-teaching and student-teaching semesters? Or, do they gain efficacy with working with these types of students over a period of time? In extensive studies by Ashton, Webb, & Doda (1982a, 1982b, 1983), teachers have reported continual challenges and threats to their sense of efficacy. A few questions would be worthy of exploration. For example, what are the perceived threats to novices' sense of efficacy? How does this list compare to that of the inservice teachers' lists?

It has been suggested by some recent investigators (McDiarmid & Price, 1993; Pasch, 1993) that teachers most often judge cultural and racial groups according to their often unquestioned beliefs about their own group. This study focused upon the beliefs that Caucasian, pre-student-teaching novices had about African American students, especially in regard to the two novices who were placed into schools consisting of 100% African American student populations. It was found that pre-student-teaching novices' beliefs, about other cultural and racial groups, were not different from inservice teachers' beliefs reported in other studies. Further investigations might explore the role reversal of African American novices entering predominantly Caucasian elementary schools for clinical experiences and their beliefs about this cultural or racial group. Also, the efficacy levels and beliefs that novices have

concerning socioeconomic groups different from their own should be further examined.

Finally, concerning subject area efficacy, one important question remains: Why was science and social studies personal teaching efficacy significantly different? This study has focused on the effect of the clinical placement into the public elementary schools upon novices' sense of efficacy and has obviously overlooked the effects of other variables. An examination of the literature concerning gender differences in the subject areas might provide some insight into the differences found in this study. Further examinations of novices' transcripts should be made to reveal grades earned in subject areas in their undergraduate studies. The analysis of this data may provide some information concerning those undefined variables that most likely also affected the variance in pre-student-teaching novices' sense of efficacy.

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Table 1

Descriptive Data: Means and Standard Deviations

	GTE General Teaching Efficacy		PTE Personal Teaching Efficacy	
	$\bar{x}$	sd	$\bar{x}$	sd
Science	2.91	5.00	1.09	7.99
Social Studies	1.88	4.57	5.24	7.50
Language Arts	1.90	4.19	3.12	7.87
Mathematics	1.24	4.64	3.36	7.51
TOTAL	1.98	4.62	3.20	7.81

Table 2

MANOVA Test Criteria and F Approximations for the Hypothesis of No Overall Subject Area Effect

"Hypothesis 1"

H = Type IV SS&CP Matrix for Subject Area
E = Error SS&CP Matrix

S=2 M=0 N=112.5

Statistic	Value	F	Num DF	Den DF	Pr>F
Wilks' Lambda	3.94	2.33	6	454	0.03

NOTE: F Statistic for Wilks' Lambda is exact.

Table 3

MANOVA on the Differences in Before and After Clinical Experience Scores

"Hypothesis 1-a: Follow-up one-way ANOVA"

Dependent Variable: GTED "General Teaching Efficacy"

Source	DF	Sum of Squares	F Value	Pr>F
Model	3	83.21	1.31	0.27
Error	228	4844.72		
Corrected Total	231	4927.93		

R-Square = 0.02

Table 4

MANOVA on the Differences in Before and After Clinical Experience Scores

"Hypothesis 1-b: Follow-up one-way ANOVA"

Dependent Variable: PTED "Personal Teaching Efficacy"

Source	DF	Sum of Squares	F Value	Pr>F
Model	3	502.74	2.81	0.04
Error	228	13592.74		
Corrected Total	231	14095.48		

R-Square = 0.04

Table 5

Tukey's Studentized Range (HSD) Test for Variable: PTED - Personal Teaching Efficacy

Alpha = 0.05
df = 228
MSE = 59.62
Critical Value of Studentized Range = 3.66
Minimum Significant Difference = 3.71

Means with the same letter are not significantly different.

Tukey Grouping		Mean	N	Subject Area
	A	5.24	58	Social Studies
B	A	3.36	58	Mathematics
B	A	3.12	58	Language Arts
B		1.09	58	Science

Code Number_____ Date_____

Please indicate the degree to which you agree or disagree with each statement below by circling the appropriate letters to the right of each statement.

SA = Strongly Agree
A = Agree
UN = Uncertain
D = Disagree
SD = Strongly Disagree

1. When a student does better than usual in language arts, it is often because the teacher exerted a little extra effort. SA A UN D SD

2. I will continually find better ways to teach language arts. SA A UN D SD

3. Even if I try very hard, I will not teach language arts as well as I will most subjects. SA A UN D SD

4. When the language arts grades of students improve, it is often due to their teacher having found a more effective teaching approach. SA A UN D SD

5. I know the steps necessary to teach language arts concepts effectively. SA A UN D SD

6. I will not be very effective in monitoring language arts activities. SA A UN D SD

7. If students are underachieving in language arts, it is most likely due to ineffective language arts teaching. SA A UN D SD

8. I will generally teach language arts ineffectively. SA A UN D SD

9. The inadequacy of a student's language arts background can be overcome by good teaching. SA A UN D SD

10. The low language arts achievement of some students cannot generally be blamed on their teachers. SA A UN D SD

11. When a low-achieving child progresses in language arts, it is usually due to extra attention given by the teacher. SA A UN D SD

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12. I understand language arts concepts well enough to be effective in teaching elementary language arts. SA A UN D SD

13. Increased effort in language arts teaching produces little change in some students' language arts achievement. SA A UN D SD

14. The teacher is generally responsible for the achievement of students in language arts. SA A UN D SD

15. Students' achievement in language arts is directly related to their teacher's effectiveness in language arts teaching. SA A UN D SD

16. If parents comment that their child is showing more interest in language arts at school, it is probably due to the performance of the child's teacher. SA A UN D SD

17. I will find it difficult to explain to students language arts projects or activities. SA A UN D SD

18. I will typically be able to answer students' language arts questions. SA A UN D SD

19. I wonder if I will have the necessary skills to teach language arts. SA A UN D SD

20. Given a choice, I will not invite the principal to evaluate my language arts teaching. SA A UN D SD

21. When a student has difficulty understanding a language arts concept, I will usually be at a loss as to how to help the student understand it better. SA A UN D SD

22. When teaching language arts, I will usually welcome student questions. SA A UN D SD

23. I do not know what to do to turn students on to language arts. SA A UN D SD

Code Number_____ Date_____

Please indicate the degree to which you agree or disagree with each statement below by circling the appropriate letters to the right of each statement.

SA = Strongly Agree
A = Agree
UN = Uncertain
D = Disagree
SD = Strongly Disagree

1. When a student does better than usual in mathematics, it is often because the teacher exerted a little extra effort. SA A UN D SD

2. I will continually find better ways to teach mathematics. SA A UN D SD

3. Even if I try very hard, I will not teach mathematics as well as I will most subjects. SA A UN D SD

4. When the mathematics grades of students improve, it is often due to their teacher having found a more effective teaching approach. SA A UN D SD

5. I know the steps necessary to teach mathematics concepts effectively. SA A UN D SD

6. I will not be very effective in monitoring mathematics activities. SA A UN D SD

7. If students are underachieving in mathematics, it is most likely due to ineffective mathematics teaching. SA A UN D SD

8. I will generally teach mathematics ineffectively. SA A UN D SD

9. The inadequacy of a student's mathematics background can be overcome by good teaching. SA A UN D SD

10. The low mathematics achievement of some students cannot generally be blamed on their teachers. SA A UN D SD

11. When a low-achieving child progresses in mathematics, it is usually due to extra attention given by the teacher. SA A UN D SD

12. I understand mathematics concepts well enough to be effective in teaching elementary mathematics. SA A UN D SD

13. Increased effort in mathematics teaching produces little change in some students' mathematics achievement. SA A UN D SD

14. The teacher is generally responsible for the achievement of students in mathematics. SA A UN D SD

15. Students' achievement in mathematics is directly related to their teacher's effectiveness in mathematics teaching. SA A UN D SD

16. If parents comment that their child is showing more interest in mathematics at school, it is probably due to the performance of the child's teacher. SA A UN D SD

17. I will find it difficult to explain to students mathematics projects or activities. SA A UN D SD

18. I will typically be able to answer students' mathematics questions. SA A UN D SD

19. I wonder if I will have the necessary skills to teach mathematics. SA A UN D SD

20. Given a choice, I will not invite the principal to evaluate my mathematics teaching. SA A UN D SD

21. When a student has difficulty understanding a mathematics concept, I will usually be at a loss as to how to help the student understand it better. SA A UN D SD

22. When teaching mathematics, I will usually welcome student questions. SA A UN D SD

23. I do not know what to do to turn students on to mathematics. SA A UN D SD

Code Number_____ Date_____

Please indicate the degree to which you agree or disagree with each statement below by circling the appropriate letters to the right of each statement.

SA = Strongly Agree
A = Agree
UN = Uncertain
D = Disagree
SD = Strongly Disagree

1.	When a student does better than usual in science, it is often because the teacher exerted a little extra effort.	SA A UN D SD
2.	I will continually find better ways to teach science.	SA A UN D SD
3.	Even if I try very hard, I will not teach science as well as I will most subjects.	SA A UN D SD
4.	When the science grades of students improve, it is often due to their teacher having found a more effective teaching approach.	SA A UN D SD
5.	I know the steps necessary to teach science concepts effectively.	SA A UN D SD
6.	I will not be very effective in monitoring science activities.	SA A UN D SD
7.	If students are underachieving in science, it is most likely due to ineffective science teaching.	SA A UN D SD
8.	I will generally teach science ineffectively.	SA A UN D SD
9.	The inadequacy of a student's science background can be overcome by good teaching.	SA A UN D SD
10.	The low science achievement of some students cannot generally be blamed on their teachers.	SA A UN D SD
11.	When a low-achieving child progresses in science, it is usually due to extra attention given by the teacher.	SA A UN D SD

12. I understand science concepts well enough to be effective in teaching elementary science. SA A UN D SD

13. Increased effort in science teaching produces little change in some students' science achievement. SA A UN D SD

14. The teacher is generally responsible for the achievement of students in science. SA A UN D SD

15. Students' achievement in science is directly related to their teacher's effectiveness in science teaching. SA A UN D SD

16. If parents comment that their child is showing more interest in science at school, it is probably due to the performance of the child's teacher. SA A UN D SD

17. I will find it difficult to explain to students science projects or activities. SA A UN D SD

18. I will typically be able to answer students' science questions. SA A UN D SD

19. I wonder if I will have the necessary skills to teach science. SA A UN D SD

20. Given a choice, I will not invite the principal to evaluate my science teaching. SA A UN D SD

21. When a student has difficulty understanding a science concept, I will usually be at a loss as to how to help the student understand it better. SA A UN D SD

22. When teaching science, I will usually welcome student questions. SA A UN D SD

23. I do not know what to do to turn students on to science. SA A UN D SD

Code Number_____ Date_____

Please indicate the degree to which you agree or disagree with each statement below by circling the appropriate letters to the right of each statement.

SA = Strongly Agree
A = Agree
UN = Uncertain
D = Disagree
SD = Strongly Disagree

1. When a student does better than usual in social studies, it is often because the teacher exerted a little extra effort. SA A UN D SD

2. I will continually find better ways to teach social studies. SA A UN D SD

3. Even if I try very hard, I will not teach social studies as well as I will most subjects. SA A UN D SD

4. When the social studies grades of students improve, it is often due to their teacher having found a more effective teaching approach. SA A UN D SD

5. I know the steps necessary to teach social studies concepts effectively. SA A UN D SD

6. I will not be very effective in monitoring social studies activities. SA A UN D SD

7. If students are underachieving in social studies, it is most likely due to ineffective social studies teaching. SA A UN D SD

8. I will generally teach social studies ineffectively. SA A UN D SD

9. The inadequacy of a student's social studies background can be overcome by good teaching. SA A UN D SD

10. The low social studies achievement of some students cannot generally be blamed on their teachers. SA A UN D SD

11. When a low-achieving child progresses in social studies, it is usually due to extra attention given by the teacher. SA A UN D SD

12. I understand social studies concepts well enough to be effective in teaching elementary social studies. SA A UN D SD

13. Increased effort in social studies teaching produces little change in some students' social studies achievement. SA A UN D SD

14. The teacher is generally responsible for the achievement of students in social studies. SA A UN D SD

15. Students' achievement in social studies is directly related to their teacher's effectiveness in social studies teaching. SA A UN D SD

16. If parents comment that their child is showing more interest in social studies at school, it is probably due to the performance of the child's teacher. SA A UN D SD

17. I will find it difficult to explain to students social studies projects or activities. SA A UN D SD

18. I will typically be able to answer students' social studies questions. SA A UN D SD

19. I wonder if I will have the necessary skills to teach social studies. SA A UN D SD

20. Given a choice, I will not invite the principal to evaluate my social studies teaching. SA A UN D SD

21. When a student has difficulty understanding a social studies concept, I will usually be at a loss as to how to help the student understand it better. SA A UN D SD

22. When teaching social studies, I will usually welcome student questions. SA A UN D SD

23. I do not know what to do to turn students on to social studies. SA A UN D SD

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STEBI FORM B SCORING INSTRUCTIONS

STEP 1: Item Scoring: Items must be scored as followed: Strongly Agree = 5; Agree = 4; Uncertain = 3; Disagree = 2; and Strongly Agree = 1.

STEP 2: The following items must be reverse scored in order to produce consistent values between positively and negatively worded items. Reversing these items will produce high scores for those high and low scores for those low in efficacy and outcome expectancy beliefs.

Items 3, 6, 8, 10, 13, 17, 19, 20, 21, 23

In SPSSx, this reverse scoring can be accomplished by using the RECODE command. For example, recode ITEM3 with the following command:

```
RECODE   ITEM3  (5=1)  (4=2)  (2=4)  (1=5)
```

STEP 3: Items for the two scales are scattered randomly throughout the STEBI B. The items designed to measure Personal Science Teaching Efficacy Belief are as follows:

Items 2, 3, 5, 6, 8, 12, 17, 18, 19, 20, 21, 22, 23

Items designed to measure Outcome Expectancy are as follows:

Items 1, 4, 7, 9, 10, 11, 13, 14, 15, 16

Note: In the computer program, DO NOT sum scale scores before the RECODE procedures have been completed. In SPSSx, this summation may be accomplished by the following COMPUTE command:

```
COMPUTE SESCALE=ITEM2+ITEM3+ITEM5+ITEM6+ITEM8+
  ITEM12+ITEM17+ITEM18+ITEM19+ITEM20+ITEM21+
  ITEM22+ITEM23

COMPUTE OESCALE=ITEM1+ITEM4+ITEM7+ITEM9+ITEM10
  ITEM11+ITEM13+ITEM14+ITEM15+ITEM16
```

Enochs, L.G., & Riggs, I.M. (1990). Further development of an elementary science teaching efficacy belief instrument: A preservice elementary scale. School Science and Mathematics, 90(8), 694-706.